

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 1

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100

0.00



DC

Document Control

DOCUMENT CONTROL

Memo

0.00

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

8/10/09/20

HJ for BG 10-9-17

110

0.00



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT 22

DD 10-8-5

120

QC15- Crosstube Dimensional Check

0.00



QC

Quality Control

Memo

0.00

8/20/09/20

FD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval* Chief Eng / Prod Mgr	Approval* QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 2

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130



Crosstubes

Crosstubes

0.00

Memo

0.00

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube

Batch: 109956

140



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

MB 10-08-16

- ALM 10-08-16

8/6/08/12

70

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 3

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Fwd




Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150  Outsource3 Outsource process - Cad plate	Outsource process-Cadplate per QSI017 4.1.9.1 Memo Issue P/O: <u>12422</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached	0.00 0.00							<u>CZ</u> <u>10/21/18</u> <u>①</u>
160  Packaging Packaging	Receive & Inspect for Damage & Mat'l Certs Memo Ensure certificate of conformity is attached	0.00 0.00							<u>10/21/17</u> <u>①</u>
170  QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00							<u>10</u> <u>15</u> <u>①</u>

PTO

Dart Aerospace Ltd

W/O: 59907		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
10/9/14	175	NPT per QSI 038 before + after load testing per eng. this time only P/O: <u>12537</u>	CZ	10/9/14	①	✓ 10-09-14	
		dec'd + inspect	PC	10/9/14	1		

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 4

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00




Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  SprayPaint	SprayPaint	0.00							
	Memo 1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2	0.00							
190  QC	QC14- Inspect Spray Paint	0.00							
	Memo Then, Wrap in plastic bag to protect from scratches	0.00							
200  Crosstubes	Crosstubes	0.00							
	Memo 1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS	0.00							

ml 10 09 15 (1)

ET 10-09-16

ml 10 09 16 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 5

Item ID: D350-748-101

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

220

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

230

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 59907

Wednesday, June 16, 2010 1:01:21 PM

Page 6

Item ID: D350-748-101

Accept

Revision ID:

Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010 Start Qty: 1.00

Required Date: 7/8/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00							
	Packaging								
	Packaging								
	Memo	0.00							
	Identify and pack for shipping as per PPP D350-748-101								
	Location: _____								
	PPP Rev _____								
250	QC21- Final Inspection - Work Order Release	0.00							
	QC								
	Quality Control								

10/09/21
MF
10-9-21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, June 16, 2010 1:01:26 PM

Page 1

Work Order ID: 59907

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010

Required Date: 7/8/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-141TRN		Manufactured	No			110	Each	5.0000	1	1			
Crosstube Turning Detail													

Location

Loc Qty

Loc Code

LG

B59331

5
1

DP108-5

55295
55297
55298
55299
55300

1
1
1
1
1

ALS4-1032-225

Purchased

No

200

Each

6,529.000

1

1

Insert

MA 10 08 16

Location

Loc Qty

Loc Code

PK011

110768

6529
6529

AN960JD10

NAS1149D0363J

Purchased

No

200

Each

0.0000

1

1

Washer

MA 10 08 16

B# 105792

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, June 16, 2010 1:01:26 PM

Page 2

Work Order ID: 59907

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010

Required Date: 7/8/2010

Start Qty: 1.00

Required Qty: 1.00

D2856-400	Manufactured	No	200	f	238.2388	1.181	1.243158
Abraison Strip							

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST403	238.2388	
50593	43.4568	
<u>56626</u>	194.782	

D3500-1	Manufactured	No	200	Each	32.0000	4	4
Saddle							

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST425	32	
52326	6	
55605	26	

D3502-1	Manufactured	No	200	Each	64.0000	2	2
Support							

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST066	64	
47120	1	
50287	38	
2x 52903	25	

MS21920-20	Purchased	No	200	Each	101.0000	2	2
Clamp (per MIL-DTL-8783C)							

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	101	
112624	24	
112793	3	
<u>114687</u>	50	
114779	24	

Wednesday, June 16, 2010 1:01:26 PM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, June 16, 2010 1:01:26 PM

Page 3

Work Order ID: 59907

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010

Required Date: 7/8/2010

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

137.0000

1

1



Screw



10-09-16

Location

Loc Qty

Loc Code

ST291

137

112794

37

112940

100

AN4-41A

Purchased

No

220

Each

226.0000

8

8



Bolt



10/9/17 SP

Location

Loc Qty

Loc Code

ST360

226

111424

26

113359

100

114941

100

AN4-6A

Purchased

No

220

Each

1,121.000

16

16



Bolt



10/9/17 SP

Location

Loc Qty

Loc Code

ST356

1121

112933

96

113149

522

114523

2

114615

1

114941

500

16

Wednesday, June 16, 2010 1:01:26 PM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, June 16, 2010 1:01:26 PM

Page 4

Work Order ID: 59907

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010

Required Date: 7/8/2010

Start Qty: 1.00

Required Qty: 1.00

AN5-32A Purchased No 220 Each 178.0000 4
Bolt

Location	Loc Qty	Loc Code
ST340	178	
113121	28	
114056	100	
114405	50	

AN960JD416 NAS1149D0463J Purchased No 220 Each 18.0000 32
Washer

Location	Loc Qty	Loc Code
ST357	18	
107939	18	

AN960JD516 NAS1149D0563J Purchased No 220 Each 0.0000 8
Washer
D3501-1 Manufactured No 220 Each 478.0000 16
Bushing

Location	Loc Qty	Loc Code
ST066	478	
45402	15	
45918	159	
48268	204	
53779	100	

Wednesday, June 16, 2010 1:01:26 PM

Shop Packet Print

Page 4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, June 16, 2010 1:01:26 PM

Page 5

Work Order ID: 59907



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 6/16/2010

Required Date: 7/8/2010

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

Purchased

No

220

Each

3,188.000

24

24



Nut



M115108 10/9/17sf

Location

Loc Qty

Loc Code

ST139

2

111827

2

ST300

3186

113422

68

114523

110

114718

1000

114784

2000

9063

8

MS21042L5

Purchased

No

220

Each

695.0000

4

4



Nut



M115156 10/9/17sf

Location

Loc Qty

Loc Code

ST139

500

114813

500

ST300

195

114449

195

Wednesday, June 16, 2010 1:01:26 PM

Shop Packet Print

Page 5

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

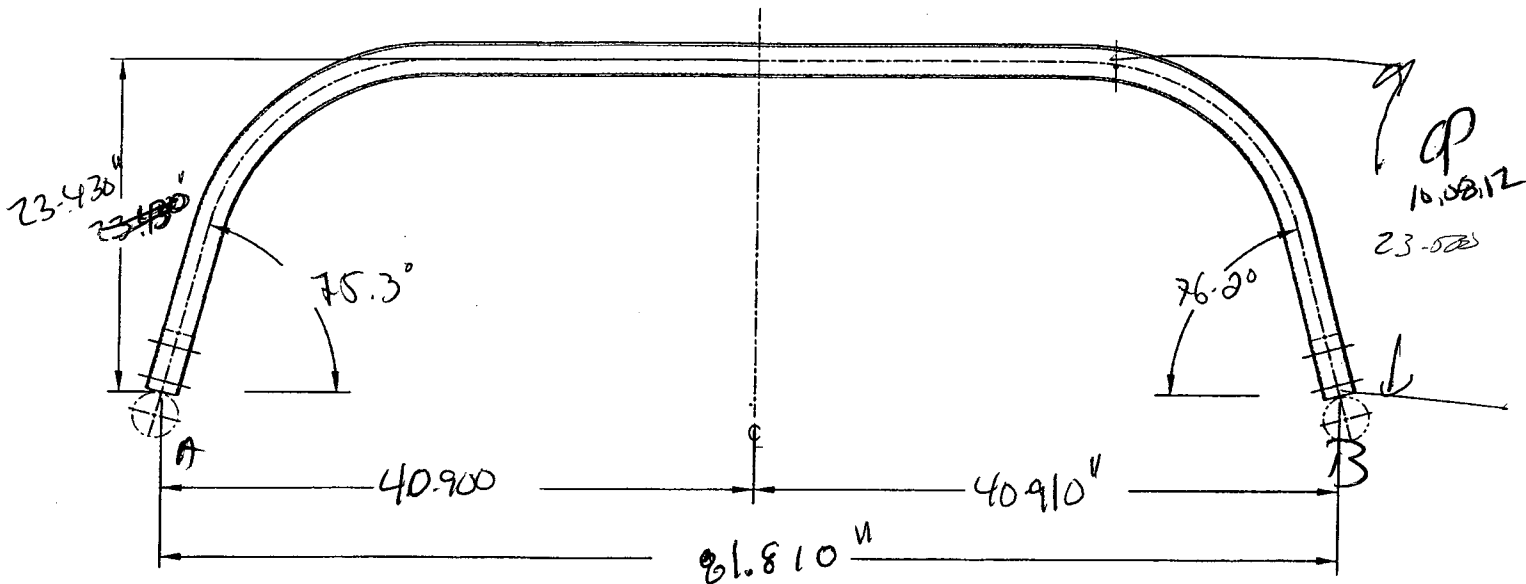
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	59907
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist = 0.003" OK P 10.08.12

QC15 Inspection	J
Date	10/08/12

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	[Signature]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 39907

E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	RF		
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	09.09.30		

RELEASED
R 2009-10-29

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA
DRAWING NO. D350-748-141
TITLE CROSSTUBE (AS 350/355 HI FWD)
REV. E SHEET 1 OF 4
SCALE NTS
COPYRIGHT © 2006 BY DART AEROSPACE LTD
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

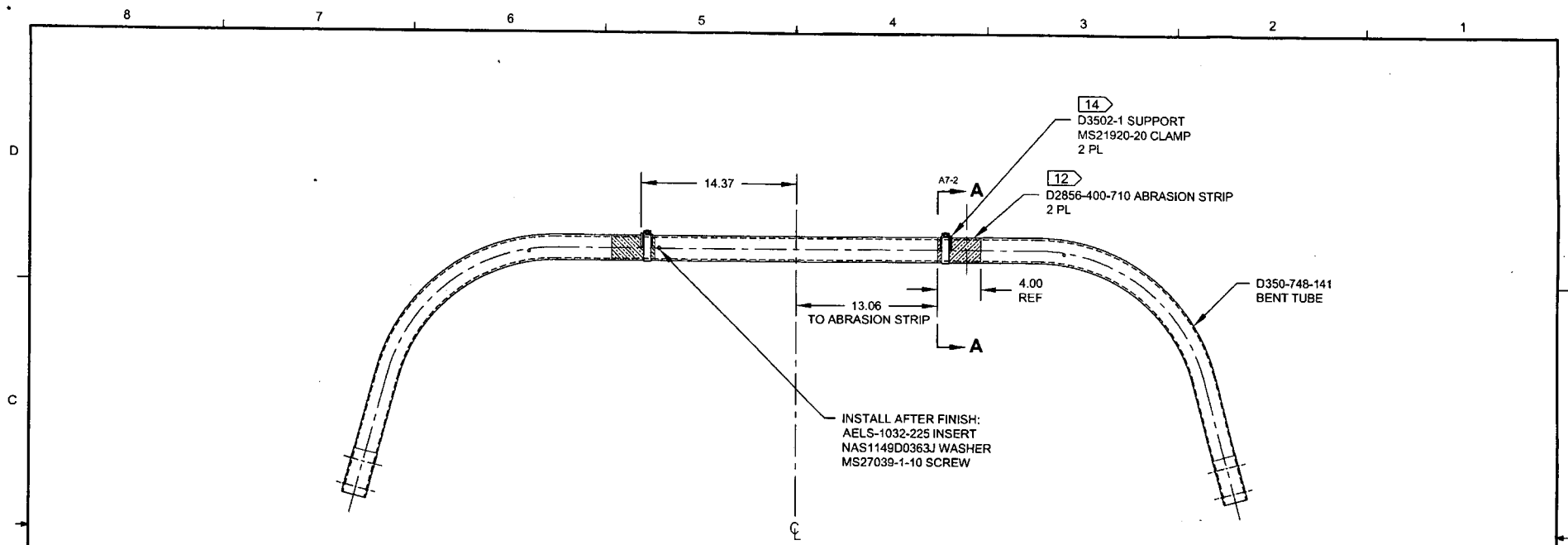
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

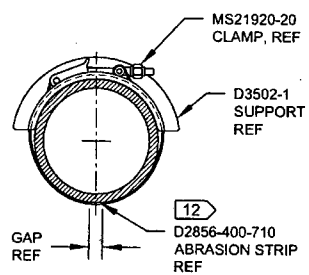
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

wlo 59907

RELEASED
2009-10-29

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. E
MFG. APPR.	97	D350-748-141	SHEET 2 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

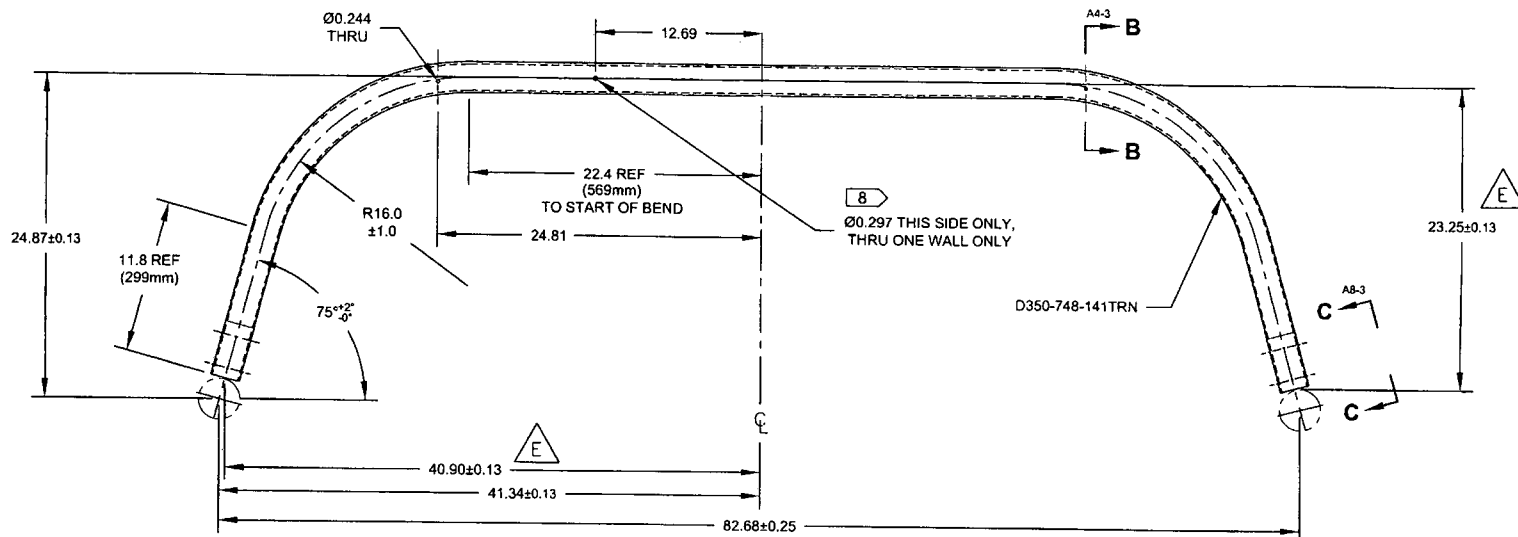
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

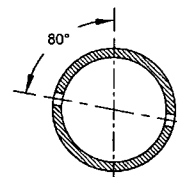
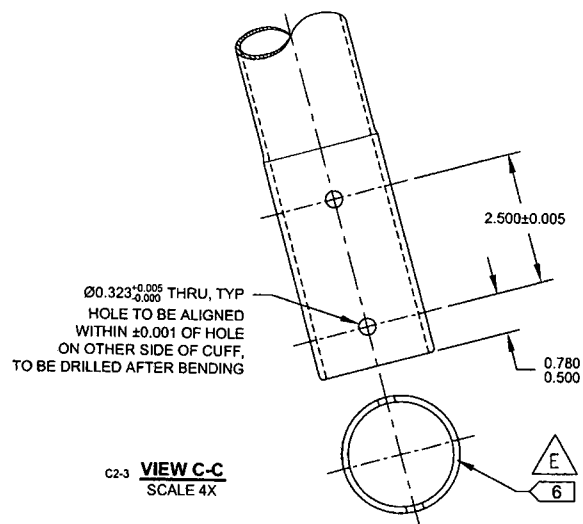
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
 SCALE 4X

w/o 59907

RELEASED
 2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	<small>COPYRIGHT © 2005 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

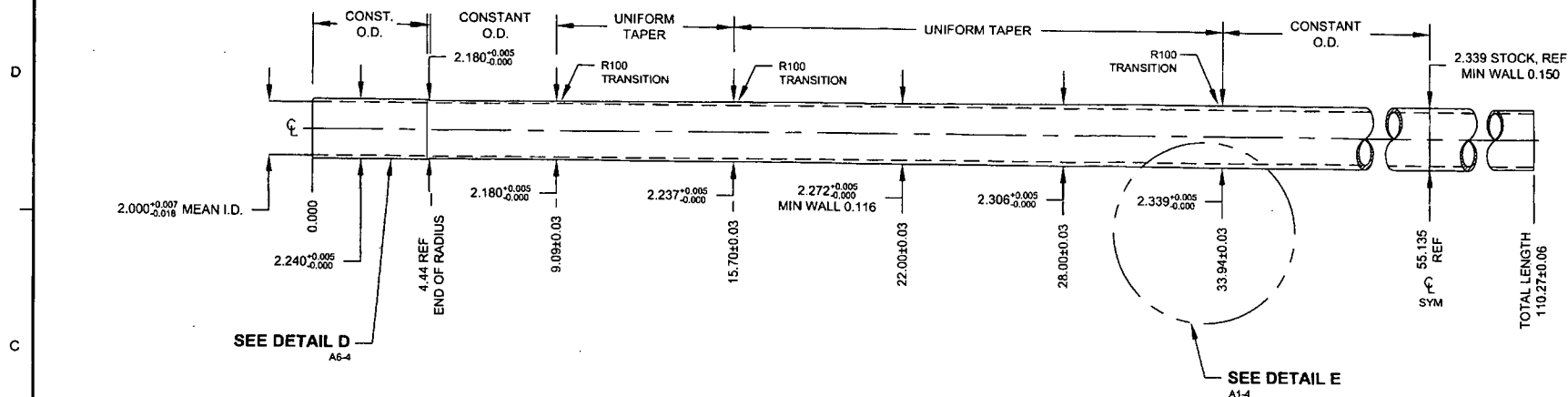
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

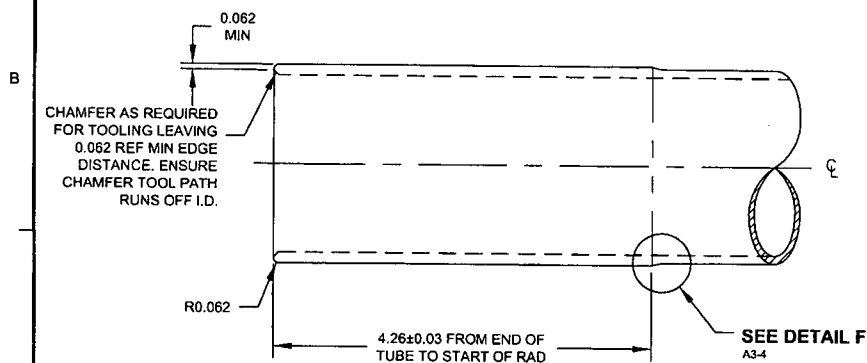
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

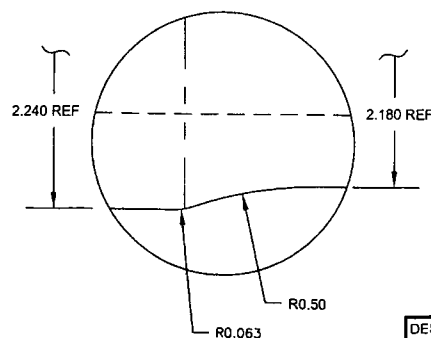
8 7 6 5 4 3 2 1



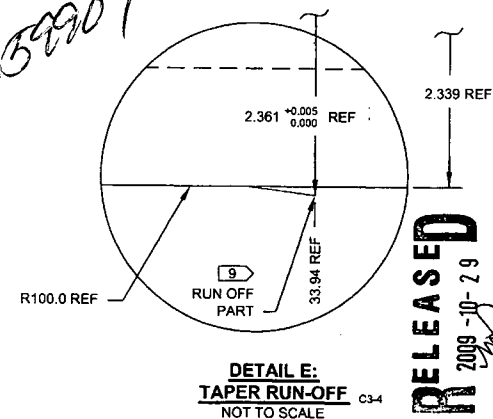
**D350-748-141TRN
TURNING DETAIL**



**DETAIL D:
CROSSTUBE CUFF** C7-4
SCALE 3X



**DETAIL F:
CUFF TRANSITION** A5-4
NOT TO SCALE



**DETAIL E:
TAPER RUN-OFF** C3-4
NOT TO SCALE

DESIGN	Q	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	JS	D350-748-141	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	JS	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD	
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

RELEASED
2009-10-29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Aug-31-2010

**CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7**

**W/O #: 97911
INVOICE #: 51056**

**CONTRACT OR
PURCHASE ORDER # PO12422**

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101

S/N # B59907

**STRESS RELIEF BAKE @ 375 DEG. HEAT CHART #10-920. MPI IAW
ASTM-E-1444. CADMIUM PLATED IAW AMS-QQ-P-416C, TYPE 2
YELLOW, CLASS 2. BAKE HEAT CHART #10-916.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A large, stylized handwritten signature in black ink, written over a horizontal line.



LIQUID PENETRANT TEST REPORT

P- 15189

CLIENT DART Aerospace DATE Sept 13-2010 PAGE 1 OF 1
ATTENTION LINDA/CHANTEL ACUREN JOB NO. 100-10-0858
ADDRESS 1270 ADELPHI STREET PO/WO NO. 17422
HAWKESBURY ON WORK LOCATION HAWKESBURY PLANT
KOH 1KT ACCEPTANCE STD. ASTM 1417 REV./DATE 2007
PROJECT F.P.I. on CROSS TUBES
ITEM(S) EXAMINED 11

JOB DESCRIPTION WET FLOWESCENT LIQUID PENETRANT PROCEDURE No. LT-0002 REV./DATE — TECHNIQUE No. LT-0002 REV./DATE —
PART NO. — MATERIAL STEEL THICKNESS —
SCOPE INSPECTION CARRIED OUT 100% EXTERNAL.

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	<u>MAGNAFLUX</u>		BLACK LIGHT S/N	<u>16459</u>	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
PENETRANT	<u>2LG7</u>	MINIMUM DWELL TIME	<u>45</u>	MIN.	<input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME	<u>>10</u>	MIN.	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
DEVELOPER	<u>SKD 52</u>	MINIMUM DWELL TIME	<u>10</u>	MIN.	OTHER <u>LAB. NO.</u>
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	LIGHT METER S/N	<u>1090866</u>
				CAL DUE DATE	<u>Oct-1-2010</u>

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F	<input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F	<input type="checkbox"/> > 52°C/ 125°F	

RESULTS- (☐ METRIC ☐ IMPERIAL)

1 - CROSS TUBE W.O. 59905 ✓ 1 - CROSS TUBE W.O. 60815 ✓ 1 - CROSS TUBE W.O. 59907 ✓ 1 - CROSS TUBE W.O. 60816 ✓ 1 - CROSS TUBE W.O. 59905 ✓ 1 - CROSS TUBE W.O. 60820 ✓ 1 - CROSS TUBE W.O. 60821 ✓ 1 - CROSS TUBE W.O. 60822 ✓ 1 - CROSS TUBE W.O. 60817 ✓ 1 - CROSS TUBE W.O. 60918 ✓ 1 - CROSS TUBE W.O. 59904 ✓ 1 - CROSS TUBE W.O. 59906 ✓	- EXAMINATION WAS COMPLETED PRIOR TO DEFLECTION TESTING M/ 10.09.15
--	---

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE <u>Jan Tiffley</u>	SIGNATURE <u>[Signature]</u>	DTR # <u>EG3387</u>
TECHNICIAN (SIGNATURE): <u>Mike Jettan</u>	NAME (PRINT): <u>Mike Jettan</u>	REPORT REVIEWED BY: <u>NAME INITIALS</u>
CGSB LEVEL <u>3</u> SNT LEVEL <u>—</u>	CGSB LEVEL <u>—</u> SNT LEVEL <u>—</u>	
CGSB REG. No <u>6606</u>	CGSB REG. No <u>—</u>	



LIQUID PENETRANT TEST REPORT

P- 15191

CLIENT DART Aerospace DATE SEPT 13-2010 PAGE 1 OF 1
ATTENTION LINDA/CHANTEL ACUREN JOB NO. 188-10-0838 TIME AM ☒ PM ☐
ADDRESS 1270 ABELDEEN STREET PO/WO NO. 12427
HAWKESBURY, ON. WORK LOCATION HAWKESBURY PLANT.
KOH IK7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007
PROJECT F.P.I. ON CROSS TUBES
ITEM(S) EXAMINED 19

JOB DESCRIPTION PROCEDURE NO. LT 0002 REV./DATE - TECHNIQUE NO. LT 1412 REV./DATE -
PART NO. - MATERIAL STEEL THICKNESS -
SCOPE WET FLOUORESCENT LIQUID PENETRANT
INSPECTION CARRIED OUT 100% EXTERNAL

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/CM² ☐ AMBIENT < 2 fc
PENETRANT 2L07 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER #20 MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE OCT 19
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY 2010

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☐ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1 - CROSS TUBE W.O. 59905 ✓	<p>- EXAMINATION WAS COMPLETED</p> <p>* AFTER DEFLECTION TESTING</p> <p>MM 10-09-15</p>
1 - CROSS TUBE W.O. 60815 ✓	
1 - CROSS TUBE W.O. 59907 ✓	
1 - CROSS TUBE W.O. 60816 ✓	
1 - CROSS TUBE W.O. 60820 ✓	
1 - CROSS TUBE W.O. 60821 ✓	
1 - CROSS TUBE W.O. 60822 ✓	
1 - CROSS TUBE W.O. 60817 ✓	
1 - CROSS TUBE W.O. 60818 ✓	
1 - CROSS TUBE W.O. 59904 ✓	
1 - CROSS TUBE W.O. 59906 ✓	

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES
CLIENT REPRESENTATIVE John Titterton DTR # E6 3387
TECHNICIAN (SIGNATURE): Mike Johnston REPORT REVIEWED BY:
NAME (PRINT): Mike Johnston NAME INITIALS
1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL II SNT LEVEL _____ CGSB LEVEL _____ SNT LEVEL _____
CGSB REG. No 6606 CGSB REG. No _____

5.0 PARTS LIST

Qty -101	Qty -201	Part Number	Description
X		D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X	D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
1		D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1	D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
*2	*2	D3502-1	SUPPORT
*2	*2	D2856-400-710	ABRASION STRIP
*1	*1	AELS-1032-225	INSERT
*2	*2	MS21920-20	CLAMP
*1	*1	MS27039-1-10	SCREW
*1	*1	AN960JD10	WASHER
4	4	D3500-1	SADDLE
16	16	D3501-1	BUSHING
16	16	AN4-6A	BOLT
8	8	AN4-41A	BOLT
4	4	AN5-32A	BOLT
32	32	AN960JD416	WASHER
8	8	AN960JD516	WASHER
24	24	MS21042L4	NUT (OR MS21042-4)
4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/241 ASSEMBLIES ABOVE

• COPYRIGHT © 2006 BY DART AEROSPACE LTD. •

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

Revision: **B**

Date: 07.06.15